

Experience from market-based dissemination of pico-hydro systems in Laos



Lessons learned from the EASE network

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GTZ Conference: Im Abseitz der Netze

ETC Energy



- **Programs of ETC Energy:**
 - DGIS: MFS Energy Access (2007 – 2011)
 - ADB: Energy for All Partnership Secretariat (2010 – 2011)
 - DGIS/Philips: Sustainable Energy Services for Africa (2009 – 2012)
 - Various other programs and consultancies

MFS Energy Access



- 2007 – 2011
- Funded by DGIS under MFS1
- Implemented through EASE network
- Strategies:
 - Access (thematic focus)
 - Control (vision in which we work)
 - Sharing (way we work together)

The EASE network



Key characteristics:

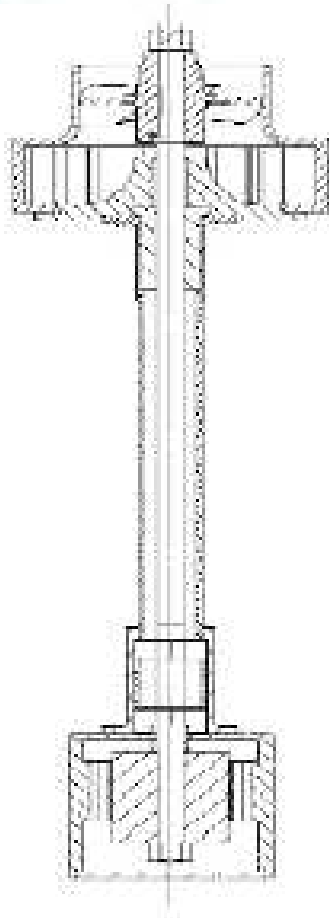
- **Partners:** 21 in 8 countries
- **Aim:** Scale up energy access for the poor through sustainable local business models
- **Approach:**
 - Rural people should be able to get the energy services needed on a commercial basis from a local supplier
 - EASE partners contribute to overcoming obstacles in local markets through short-term interventions, without becoming part of these markets



Pico-hydro in Lao PDR



Pico-hydro technology



- **Different types:**
 - propeller (low-head)
 - turgo (high-head)
- **Most common:**
 - 300 – 1000 Watts
 - Some light bulbs
 - 1 TV + CD
- **Costs:** USD 25 -70

Pico-hydro technology



What does it look like?

Pictures:

- **Installations**
- **Uses**















Maintenance and problems



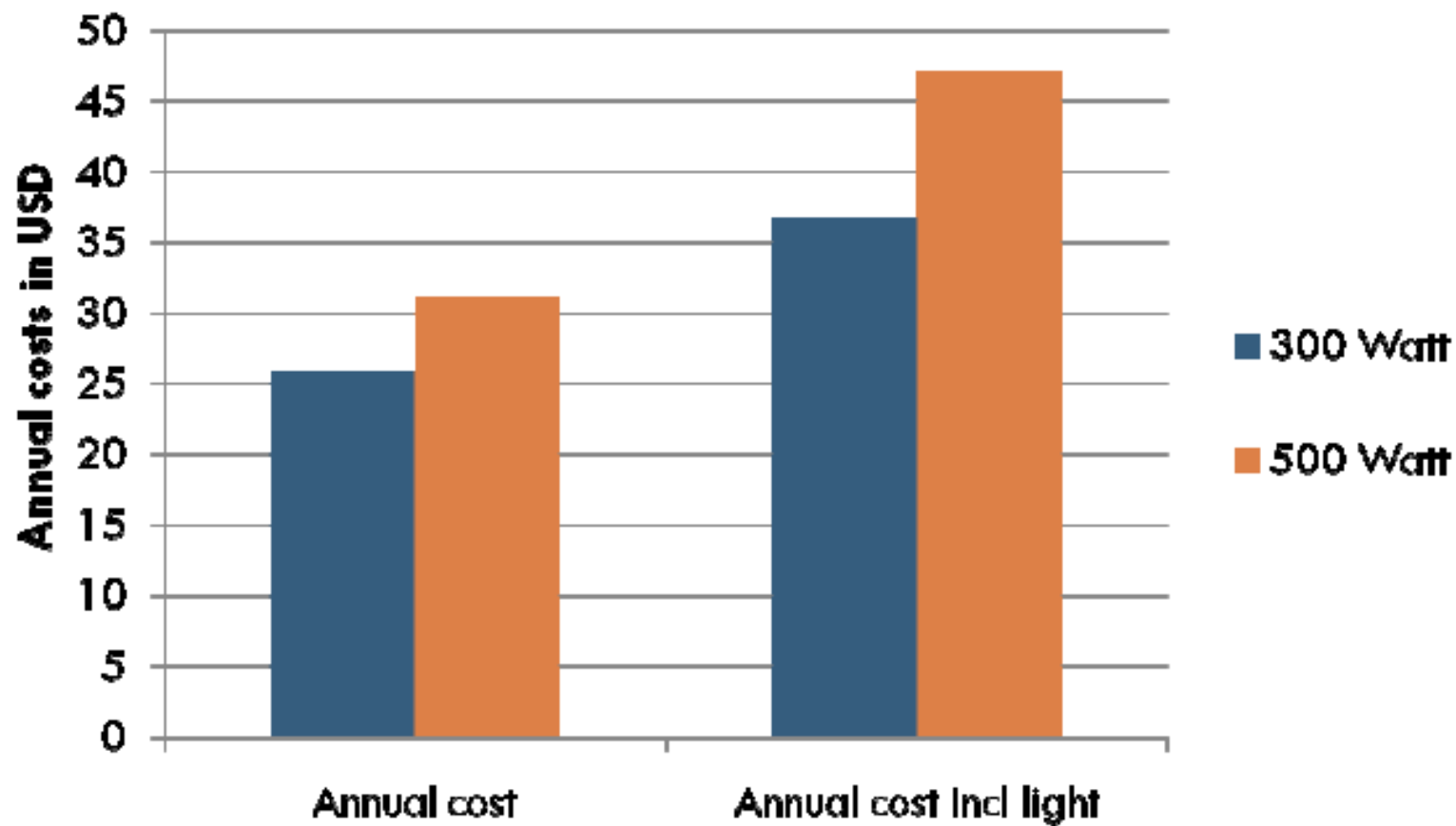
Maintenance

- Daily maintenance required
 - Taking out of the water and cleaning (garbage, leaves, etc.)
- Frequent repairs are necessary
- Everything is done by villagers themselves

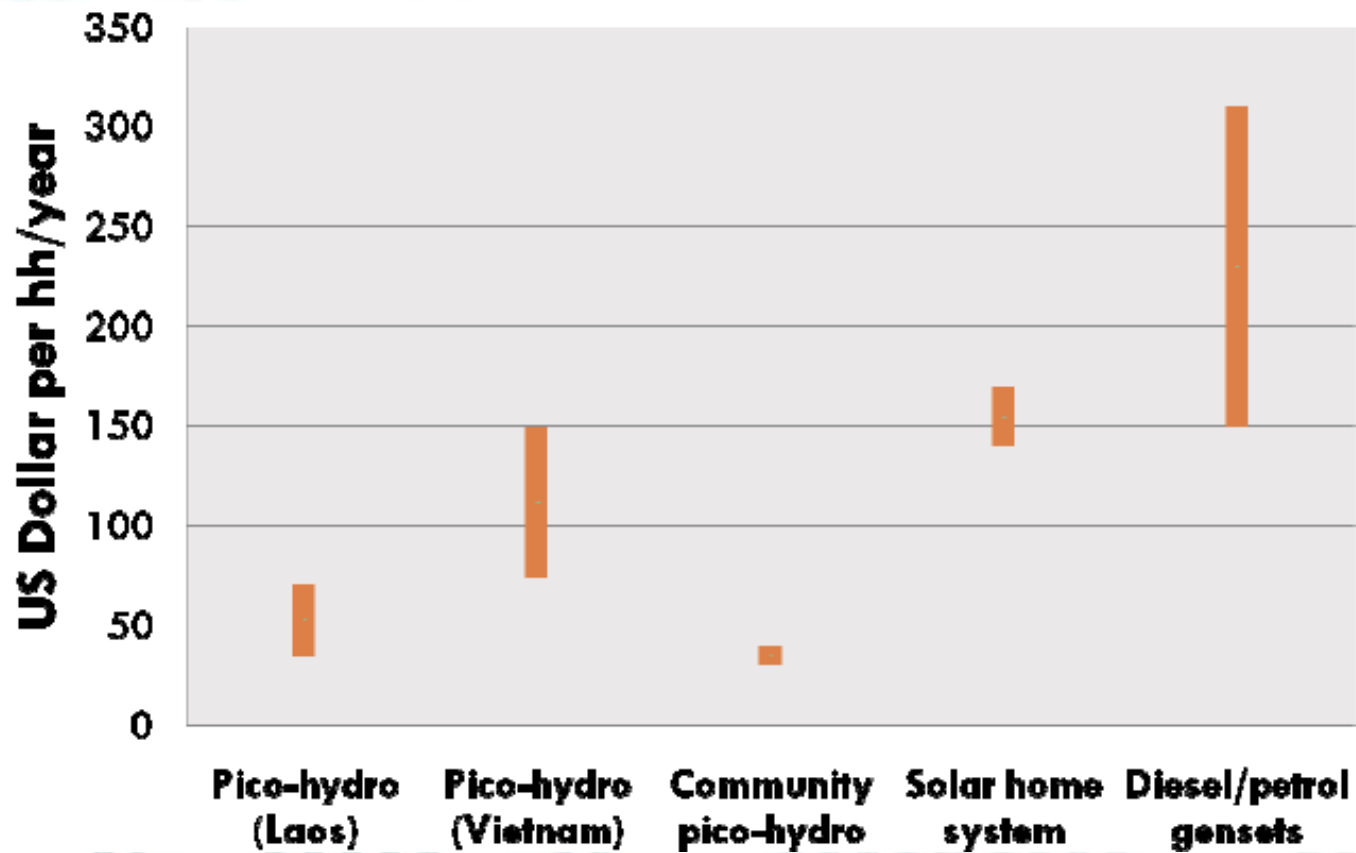
Problems

- Hardware
 - Lower output than indicated
 - Low efficiency
 - Winding / bearing failure
- Voltage fluctuations
 - No regulation: breaking of light bulbs and other devices
- Cables
 - Breaking
 - Bare cables

Costs / affordability



Costs / affordability (2)



Pico-hydropower market



- **Produced** in China and Vietnam: low-cost
- **Traders:** from Vietnam and China, part of a network of commodities
- **Shops:**
 - Even in small villages
 - Selling units and spare parts
 - No instructions available



Pico-hydro market (2)



- Pico-hydropower (<2 kW) very common in remote rural areas
- Completely market-driven
- An estimated 60,000 pico-hydropower units provide electricity to about 90,000 households
- Yet, small and very small hydropower has received little attention from government, multilateral organizations and NGOs...
- Lot of attention to large hydropower projects

Conclusions



1. Important technology for rural electrification (estimated 60.000 units throughout Laos)
2. Diversity in uses and geographical contexts
3. Cheapest source of electricity available (compared to e.g. solar and diesel generators)
4. Poor people are willing and able to pay for electricity
5. Dissemination by word of mouth
6. Whole supply chain oriented toward lowest costs → little awareness about quality differences
7. Unsustainable practices (regulations problems, breaking devices, etc.)
8. Little to no support from government or other organizations

ETC/LIRE project



Pico-hydropower innovation & capacity building programme :

- **Duration:** 2-year program to improve safety and awareness about quality of pico-hydropower systems
- **Focus:** On economic drivers/entrepreneurs
- **Target groups:** End-users, shopkeepers, technical advisors, (LIRE)
- Disseminating best practices amongst actors in the supply chain
- **Methods:** participatory innovation development, focus group discussions, workshops

Components



1. Informational workshops for shopowners
2. Technical advisors
3. Pico-hydro installation and use manual in Lao language
4. Electronic load Controller (ELC)

1. Shop-owner workshop



- **General workshop** (pico-hydro turbines and complementary products; providing information to customers; business support) followed by targeted tailor-made coaching
- **Sustainability:**
This intervention aligns the goals of shopowners (selling more products) with the goals of end-users (safe and efficient electricity from pico-hydro)
Product quality

2. Technical advisors



Trained experts:

- Provincial and district department of Energy and Mines (ToT) selected together with the authorities
- Experienced pico-hydro technicians and end-users

Sustainability:

- intervention based on feedback from villagers: articulated need for installation advice (instead of for instance purchasing aids).
- Face to face advice = most effective, solutions based on specific environmental and use context of the village
- Technical advisors are from the own village / district

3. Manual



Pico-hydro installation and use manual:

- Important as villagers usually install the system themselves (input/guidance technicians): trial-and-terror
- Short and simple, visuals
- 'Normal' use as well as most important local adaptations
- Targeted at end users, but also shop owners, village technical advisors, welders, relevant local government authorities

Sustainability:

- Clear expressed need for information
- Materials (if at all) are in Chinese or Vietnamese: Lao language
- Tested and improved
- Design in black and white (easy to photocopy)

3. Manual (2)



YouTube - Pico Hydropower Training Guide - ...

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Pico Hydropower Training Guide - 00 Introduction

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Training video by the ILO Institute for Renewable Energy (IRE) for the ILO

Suggestions

- Energy in green tea?
by GreenTeaRp
5,449 views Promoted Video
- Pico Hydropower Training Guide - 02 Making the ...
by laorenewable
92 views 6:51
- Pico Hydropower Training Guide - 01 Site Assess ...
by laorenewable
116 views 3:55
- Hydropower.avi
by RyanGhostbuster
13 views 5:01
- Australian low-head micro-hydro
by Jeffe01
47,435 views 4:14
- Home's micro hydro generating system

4. ELC



Electronic Load Controller

- Reduce load fluctuations
- Significantly improves the lifetime of light bulbs and electronic devices as well as the turbine itself
- Not yet in use in, will have to be introduced in existing market

Sustainability:

- Added value seen by shopowners and end-users
- Cost-effective
- Ease of use (no more inserting/removing light bulbs in different combinations of wattage to match pico-hydropower output)

Sustainability factors



- **Not only business model, but also intervention**
- **Affordability**
- **Product quality and product use)**
- **Information/advice and After-Sales Service**

More information



- LIRE: www.lao-ire.org
- ETC Foundation: www.etc-international.org
- EASE network: www.ease-web.org (magazines and business model publication)
- Email: k.kauw@etcnl.nl

A photograph of a man in a light-colored shirt holding a glowing incandescent lightbulb up towards the camera. The background is a cluttered, dimly lit room with various items hanging and scattered around. The lightbulb is the central focus, emitting a warm glow. The text "Thank you for your attention!" is overlaid in white at the bottom of the image.

Thank you for your attention!